AMENDMENTS

In the Claims:

Claim 1. (Currently Amended) Isolated photoprotein containing an amino acid sequence which:

a) is able to bind coelenterazine and calcium, producing bioluminescence;

b) is identical by at least 90% to SEQ ID NO: 1 (Clytin);

c) is in sequence alignment with SEQ ID NO: 1 (Clytin), ~~presents~~ and comprises one of the following single or multiple substitutions (the residue positions are ~~referred~~ with reference to SEQ ID NO: 1):

i) $C_{54}\rightarrow S$;

ii) $S_{132}\rightarrow C$;

iii) $K_{48}\rightarrow R$, $N_{195}\rightarrow D$;

iv) $Q_{68}\rightarrow R$, $A_{90}\rightarrow V$, $T_{184}\rightarrow I$;

v) $Y_{82}\rightarrow F$, $K_{110}\rightarrow N$, $F_{125}\rightarrow L$, $S_{149}\rightarrow R$;

vi) $G_{142}\rightarrow C$;

vii) $I_{53}\rightarrow V$, $S_{149}\rightarrow R$;

viii) $N_{18}\rightarrow D$, $I_{40}\rightarrow V$, $K_{56}\rightarrow R$;

ix) $Gly_{58}\rightarrow Glu$, $Asp_{69}\rightarrow Val$, $Ala_{70}\rightarrow Cys$, $Lys_{76}\rightarrow Arg$, $Lys_{77}\rightarrow Gly$, $Ile_{78}\rightarrow Cys$, $Asp_{81}\rightarrow Glu$, $Val_{86}\rightarrow Ile$, $Glu_{87}\rightarrow Ala$, $Ala_{90}\rightarrow Gln$, $Val_{92}\rightarrow Leu$, and $Glu_{97}\rightarrow Gln$

or a ~~functional derivative or~~ fragment thereof.

Claim 2. (Original) The photoprotein of claim 1, containing an amino acid sequence identical by at least 95% to SEQ ID NO: 1.

Claim 3. (Original) The photoprotein of claim 2, containing an amino acid sequence identical by at least 98% to SEQ ID NO: 1.

Claim 4. (Original) The photoprotein of claim 3, containing an amino acid sequence which is selected from the group consisting of SEQ ID NO: 2, 3, 4, 5, 6, 7, 8, 9, 10.

Claim 5. (Previously Presented) A photoprotein according to claim 1, wherein said amino acid sequence is fused to a mitochondrial target sequence.

Claim 6. (Withdrawn) An isolated polynucleotide encoding a photoprotein according to claim 1.

Claim 7. (Withdrawn) The polynucleotide of claim 6, having the sequence of SEQ ID NO: 11, 12, 13, 14, 15, 16, 17, 18, 19.

Claim 8. (Withdrawn) An expression vector containing a polynucleotide according to claim 6.

Claim 9. (Withdrawn) A prokaryotic or eukaryotic host cell containing the vector of claim 8.

Claim 10. (Withdrawn) A mammalian host cell according to claim 9.

Claim 11. (Withdrawn) A method in vitro for detecting changes in intracellular calcium concentration which comprises:

a) providing a cell expressing a photoprotein according to claim 1;

b) contacting the cell with an agent stimulating calcium influx or calcium release from intracellular stores;

c) detecting the photoprotein bioluminescence.

Claim 12. (Withdrawn) A method of screening compounds modulating intracellular calcium concentration, which comprises:

a) providing a cell expressing a photoprotein of claim 1;

b) contacting the cell with the candidate compound;

c) detecting the bioluminescence of the photoprotein.

Claim 13. (Withdrawn) A method according to claim 11, which is carried out in a high-throughput format.

Claim 14. (Withdrawn) A method according to claim 13, which is carried out with a high throughput optical screening apparatus suited for multi-sample analysis.

Claim 15. (Withdrawn) The use of a photoprotein according to claim 1 as intracellular calcium indicator.

Claim 16. (Withdrawn) The use of a photoprotein according to claim 15 in a cell-based high throughput assay.

Claim 17. (Withdrawn) The use of a photoprotein according to claim 1 for the preparation of a diagnostic composition.